Strategic Astrophysics Technology

Development of 0.5 Arc-second Adjustable Grazing Incidence X-ray Mirrors for the SMART-X Mission Concept

Completed Technology Project (2015 - 2016)

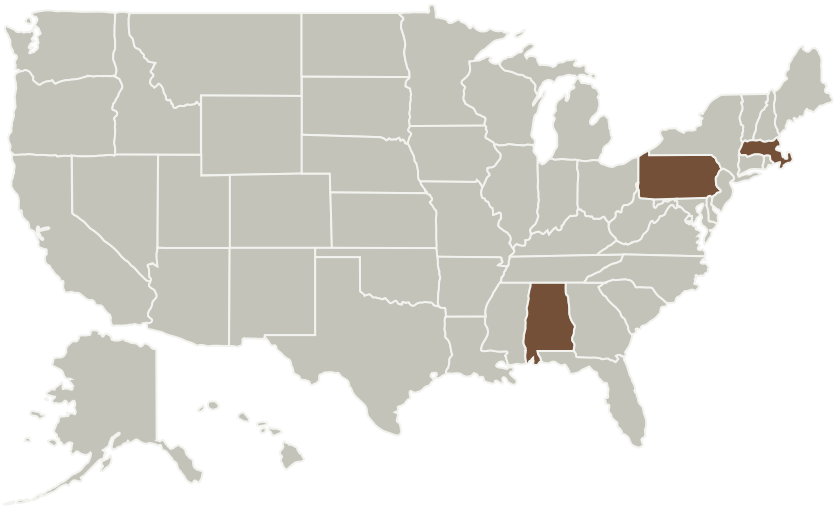
Project Introduction

This proposal is for the development of 0.5 arc-second adjustable grazing incidence X-ray optics from the current TRL 3 to higher technology readiness levels, as necessary to support the SMART-X mission concept. Our work will advance the optical system TRL by incorporating the development of 0.25 arc-second, multiple X-ray shell alignment and mounting, developing flight-like mounting, and demonstration of meeting the vibro-acoustic environment of launch. We will build upon our planned TRL 4 development (planned Sept 15) by X-ray testing a multiple X-ray shell system. In addition, we will initiate the development and industry discussions to increase the size of the adjustable mirrors from their present 10 cm x 10 cm (limited by our coating chamber) to full size (~ 20 cm x 20 to 40 cm), making use of industry capabilities. We will also continue real-time lifetime testing of piezoelectric test mirrors in a space-like environment (vacuum, radiation, spacecraft survival temperatures, etc.) begun earlier, to accrue long term data on thin film piezoelectric performance.

Anticipated Benefits

Decadal Survey Missions

Primary U.S. Work Locations and Key Partners



Development of 0.5 Arc-second Adjustable Grazing Incidence X-ray Mirrors for the SMART-X Mission Concept

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Responsible Program:

Strategic Astrophysics Technology

Development of 0.5 Arc-second Adjustable Grazing Incidence X-ray Mirrors for the SMART-X Mission Concept

Completed Technology Project (2015 - 2016)

Organizations Performing Work	Role	Type	Location
Smithsonian Astrophysical Observatory(SAO)	Supporting Organization	US Government	Cambridge, Massachusetts

Primary U.S. Work Locations	
Alabama	Massachusetts
Pennsylvania	

Project Management

Program Director:

Mario R Perez

Program Manager:

Mario R Perez

Principal Investigator:

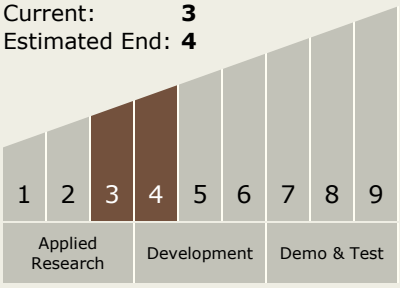
Paul Reid

Co-Investigators:

Alexey Vikhlinin
Mikhail V Gubarev
Daniel A Schwartz
Rudeger H Wilke
Stephen L O'dell
Stuart Mcmuldroch
Vincenzo Cotroneo
Brian D Ramsey
David N Burrows
Raegan L Johnson
Susan Trolier-mckinstry
Ryan Allured

Technology Maturity (TRL)

Start: **3**
Current: **3**
Estimated End: **4**



Development of 0.5 Arc-second Adjustable Grazing Incidence X-ray Mirrors for the SMART-X Mission Concept

Completed Technology Project (2015 - 2016)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems

Target Destination

Outside the Solar System